

**Table 2.** Linear regression equations for estimation of physical properties, solids, sediment, major ions, nutrients, and bacteria in Rattlesnake Creek near Zenith, Kansas, December 1998 through June 2001

[*n*, number of samples; MSE, mean square error;  $R^2$ , coefficient of determination; RMAE, relative mean absolute error; RPD, relative percentage difference;  $\log_{10}$ , base-10 logarithm; ALK, alkalinity, in milligrams per liter; WT, water temperature, in degrees Celsius ( $^{\circ}\text{C}$ ); *Q*, streamflow, in cubic feet per second; DS, dissolved solids, in milligrams per liter; SC, specific conductance, in microsiemens per centimeter at 25  $^{\circ}\text{C}$ ; TSS, total suspended solids, in milligrams per liter; NTU, turbidity, in nephelometric turbidity units; SSC, suspended sediment concentration, in milligrams per liter; Na, sodium, in milligrams per liter; Cl, chloride, in milligrams per liter; F, fluoride, in milligrams per liter;  $\text{SO}_4$ , sulfate, in milligrams per liter;  $\text{NO}_3$ , nitrate, in milligrams per liter; TN, total organic nitrogen, in milligrams per liter; TP, total phosphorus, in milligrams per liter; FCB, fecal coliform bacteria density, in colonies per 100 milliliters of water; --, not applicable]

Water-quality chemical or property	Regression equation	n	Concentration range <sup>1</sup>	p-value	MSE	$R^2$	RMAE	Median RPD
<b>Physical properties, solids, and sediment</b>								
Alkalinity	$\text{Log}_{10}\text{ALK} = -0.000368\text{Q} - 0.000148\text{WT}^2 + 2.36$	18	ALK 91–224 <i>Q</i> 3.6–840 WT 3.4–31.5	-- <.001 .015	0.00454	.710	10.2	7.77
Dissolved solids	$DS = 0.549SC + 14.3$	18	DS 264–5,460 SC 453–9,930	-- <.001	707	.999	1.00	1.20
Total suspended solids	$\text{Log}_{10}\text{TSS} = 0.818\log_{10}\text{NTU} + 0.348$	18	TSS 14–270 NTU 5–270	-- <.001	.0241	.825	27.3	20.1
Suspended sediment	$\text{Log}_{10}\text{SSC} = 0.926\log_{10}\text{NTU} + 0.438$	9	SSC 14.3–1,820 NTU 5–480	-- <.001	.0991	.926	37.5	11.1
<b>Major ions</b>								
Sodium	$Na = 0.203SC + 0.0938\text{Q} - 117$	18	Na 50–1,880 SC 453–9,930 <i>Q</i> 3.6–840	-- <.001 .006	597	.998	2.93	2.53
Chloride	$Cl = 0.319SC + 0.113\text{Q} - 172$	18	Cl 67–3,000 SC 453–9,930 <i>Q</i> 3.6–840	-- <.001 .002	654	.999	1.85	2.33
Fluoride	$\log_{10}F = -0.000255\text{Q} + 0.162\log_{10}SC - 0.892$	18	F 0.2–0.6 <i>Q</i> 3.6–840 SC 453–9,930	-- .018 .022	.00317	.826	11.3	10.2
Sulfate	$SO_4 = 0.0268SC + 13.17$	18	$SO_4$ 12–269 SC 453–9,930	-- <.001	75.3	.983	6.86	4.76
<b>Nutrients</b>								
Nitrate	$\text{Log}_{10}\text{NO}_3 = -0.000442SC + 2.60\log_{10}SC - 0.000998\text{WT}^2 - 7.37$	20	$\text{NO}_3$ 0.014–2.13 SC 453–9,930 WT 3.4–31.5	-- <.001 .002	.0942	.829	37.3	40.0
Total organic nitrogen	$TN = 0.00317\text{NTU} + 0.0234\text{WT} - 0.0000655SC + 0.469$	20	TN 0.050–2.5 NTU 5–480 WT 3.4–31.5 SC 453–9,930	-- <.001 .008 .050	.0798	.806	16.2	14.8

**2** **Table 2.** Linear regression equations for estimation of physical properties, solids, sediment, major ions, nutrients, and bacteria in Rattlesnake Creek near Zenith, Kansas, December 1998 through June 2001—Continued

Water-quality chemical or property	Regression equation	n	Concentration range <sup>1</sup>	p-value	MSE	R <sup>2</sup>	RMAE	Median RPD
<b>Nutrients—Continued</b>								
Total phosphorus	$TP = 0.00103NTU - 0.227\log_{10}SC + 0.00570WT + 0.776$	20	TP 0.025–0.755 NTU 5–480 SC 453–9,930 WT 3.4–31.5	-- <0.001 <.001 <.001	0.00179	0.960	11.2	12.9
<b>Bacteria</b>								
Fecal coliform bacteria <sup>2</sup>	$\log_{10}FCB = -3.40\log_{10}WT + 0.432\log_{10}NTU + 6.53$	18	FCB 90–20,000 WT 9.3–32.2 NTU 5–480	-- <.001 .036	.124	.661	43.4	50.0

<sup>1</sup>Concentration ranges and sample sizes are not always the same as those presented in table 1 because these data represent a subset of table 1.

<sup>2</sup>Equation developed only for samples during the recreation period from April 1 through October 31.